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This rising and falling of the green Weeds may seem strange to some people, but if they will be convinced by the Experiments of natural Philosophers whom I have followed several years, let them take a small Glass-bubble, such as is describ'd by Fig 10. Q R S T, leaving the small orifice at T open for the Water to run in and out, and let this Bubble be put into a Vessel with Water, they will find in Summer that by the dilation of the Particles of Air within the said Bubble, it will rise to the superficies of the Water, whereas the same Air, thro its elasticity, being contracted in cold Weather, will make room for the admission of a Mass of Water so much heavier than itself into the said Bubble, and then it will subside; and this will happen *toties quoties*.

IV. *A Letter from the Reverend Mr William Derham, F. R. S. to Mr John Haughton, F. R. S. containing his Observations on the Weather, &c. for some years last past.*

Upwinster, April the 5th, 1703.

I Lately sent my Weather and Tables of last year to Dr Sloane, and promis'd when I should hear from Mr Towneley in Lancashire, an Account of what he wrote that was curious: I have lately receiv'd Mr Towneley's Letter, and take the occasion of that Letter to write now to you, to give you my hearty thanks for all favours that I have receiv'd from you; as well as to send you some of that ingenious, curious Gentleman's Observations of last year, and my own.

And first, As to the most remarkable Weather, especially Rain, of last year, and the effects thereof: Mr Towneley tells me, that it is a general complaint in the North of England,

Lancol, that there were but small Crops of Hay, which calamity befel the Southern parts also; the cause whereof may be perceiv'd by the following first Table of Monthly Rain; in which you may perceive the growing Months of *March* and *April* to have been dry Months in *Lancashire*, and *May* no wet Month, considering the quantities of the other Months, and of other Years publish'd heretofore in the *Philos. Transf.* Here at *Upminster*, *April* was fortunately a wet Month, till the 23d, or else, no doubt, we should have suffer'd more than we did in the want of Hay; for the growing Month of *March* was a dry Month, by the following Table; and *May* (which by the same Table seemeth to have had near a due quantity of Rain) was a very dry Month by the Tables sent to Dr *Sloane*; for it appears by them, that very little Rain fell from *April* 23 till *May* 29, and then fell in great Showers, the greatest quantity of that Months Rain. Mr *Towneley* doth not tell me particulars, but I guess it to be after this manner with them in the North of *England*; for besides that *March* and *April* were dry Months with them, and *May* somewhat more wet, yet probably the wet of *May* did not fall early in *May*; for it appears by the following Table the third, that the Mercury was high, and in somewhat a fix'd Station on *May* 13.

Thus much for the Weather in the Spring-Months of the Year 1702. and the effects it had on Hay, which effects I have some reason to think extended to many parts of this Kingdom, besides those already spoken of.

As to the other Months there is little remarkable, besides the vast disproportions of Rain between *Lancashire* and *Essex*, which I should scarce take notice of, if it was not what happeneth almost every year, as will appear by the following Table 1st, which I now send to compleat what hath been published in former years in the *Transactions*; the cause of this I cannot judge of, unless it be that *Lancashire* is a more Hilly Country than *Essex*, which sort of Lands, as they more need wet than Vales and low plain Countries do

do, so have greater shares of it than these have, besides I leave it to you and others to judge, whether something may not be attributed to the Western Situation of *Lancashire* near the Sea ; from which Quarter the Winds in *England* blow more than from the Eastward:

At the foot of the Table of Rain, besides the quantity which fell in each year; I have added the depth thereof in Inches; or what depth it would have been of, if the Earth had not imbib'd it, but it had stagnated on the surface thereof.

For the satisfaction of your self and others that are curious, I have added two Tables more, of the Stations of the *Mercury* in the *Barometer* at *Towneley* in *Lancashire*, and at *Upminster* in *Essex*, with the differences thereof; and this observ'd at 3 times of the day, viz. in the Morning, and about 3 in the Afternoon at *Towneley*, but at noon at *Upminster*, and at 9 a Clock at Night. One Table to the first day of every Month; the other the most remarkably Low, High and more settl'd Stations of the 3 the last year 1702.

By these *Barometrical* Tables it may be seen whether at all, or how far consentaneous to truth, that opinion is of some learned curious Men both in *England* and abroad, viz. *That the 3 ascendeth and descendeth in all places at the same time, and in the same proportion.* It is manifest, that the 3 doth commonly rise and fall in one far distant place, when it doth so in another, but not alike: Also when any considerable variation is in one place it is so in another; when remarkably high, remarkably high; when low, low; when a great ascent or descent, generally the same elsewhere; but only the differences of all these are not in equal proportion in all places; all which seemeth reasonable to be expected, by reason of the difference of Weather in different places, especially as to wet and dry.

There is one thing more in the following third Table, which I think deserveth especial remark, because I believe it to be the most considerable alteration of the *Mercury*, that

hath ever happen'd since the invention of the *Baroscope*, and that was the descent on *Feb. 3d* and *4th* last: Concerning which, Mr *Townely* in a former Letter gives me this account, " That on *Feb. 3d* the \varnothing was at 3 in the Morning at 29. 15. " at 3. h. 28. 50. and at 10 at Night at 27. 5. The next day " it fell yet lower, and about 12 was at the lowest, *viz.* " 27. 39. but for an hour before and as much after, it varied " only so much as to make it sensible that it was fallen and " began to rise again; the lowest he had ever seen it before " was on *Nov. 18. 1674.* when it fell to 27. 63. That Mr " *Flamsteed* at the Observatory observ'd as remarkable a descent of his \varnothing ; and that it happen'd about the same time " of the day, *viz. 2* of the Clock in the Afternoon at both " places.

And lastly he tells me, " That the descent in *Feb.* last " was the greatest that has been since the filling his Tube, " which was in *March 1665.* The particulars which I observ'd here at *Upminster* about that descent were, That on *Feb. 2* the \varnothing was high, *viz. 29. 80,* the next Morning 29. 50, at Noon 29. 16, at Night 28. 43, the next Morning (*viz. Feb. 4.*) at 7 of the Clock it was fallen to 28. 5, and was globose, as if it had risen or was inclin'd to rise; But it continu'd in the same station till after Noon, and then began to rise about 2 of the Clock, and rose hastily. The Weather accompanying was fair on *Feb. 3d* in the Morning, Hazy at Noon, and Rain at Night, and a violent Tempest in the Night, and all the next Morning, of *Feb. 4th.*

Thus, Sir, I have given you the trouble of a long Letter, but with no other design than to shew you my respects and gratitude. If you think any thing in it worth the cognizance of the *Royal Society*, you may communicate it if you please. However, I desire you to do me the favour to shew it to Dr *Sloane*, because I promised him what Mr *Townely* wrote, in which you will oblige me to add to the obligations of

Yours, &c.

(1447)

TABLE I.

A Table, shewing how many Pounds, and Centesimals of a Pound *Troy* of Rain, fell at *Townley* in *Lancashire*, and at *Upminster* in *Essex*, in each month of the years 1699, &c. with the Quantity and Depth every year.

	1699.		1700.		1701		1702	
	Townl.	Upmr.	Townl.	Upmr.	Townl.	Upmr.	Townl.	Upmr.
January	17 91	8 91	20 84	3 91	22 41	14 96	21 10	9 81
Febru.	32 70	60 5	19 12	7 64	16 78	8 78	21 27	7 30
March	17 92	5 63	7 58	1 55	7 10	3 91	2 48	2 37
April	10 47	3 44	18 65	7 60	6 11	1 43	5 34	10 90
May	4 00	2 67	17 92	6 91	19 67	9 11	8 81	6 49
June	10 37	40	13 15	7 60	11 34	5 79	23 00	13 46
July	16 51	6 36	15 26	4 24	17 58	9 49	25 31	4 39
August	19 77	8 57	12 05	8 14	23 66	6 57	20 12	6 88
Septem.	16 53	8 06	23 52	14 85	21 30	5 63	23 01	8 05
October	18 90	13 49	26 44	17 15	24 59	10 21	28 57	7 92
Novem.	14 65	1 91	13 69	5 24	25 60	8 22	37 11	14 05
Decem.	16 78	5 77	26 88	10 30	10 19	9 35	41 62	10 27
Total	196 51	75 55	215 30	95 13	206 33	93 45	257 75	101 89
Depth	39 302	15 110	43 060	19 026	41 266	18 690	51 55	20 378

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TABLE II.

A Table shewing the Height of the φ at *Townley* and *Upminster*, on the first Day of every Month in the Year 1702. three times a Day, viz. about 7 in the morning and 9 at night, and about 2 at noon at *Townley*, with the difference of the φ 's Variation, and its difference between both places.

First Day of the Mon.	φ Heig. at Town	φ Heig. at Upmr.	Dayly differ. at Town	Dayly differ. at Upmr.	φ lower at Town
Jan.	29 06 28 50 58	29 28 21 10	16 32	07 11	22 31 52
Feb.	29 58 40 30	96 91 80	18 10	05 11	38 51 50
Mar.	36 36 40	68 66 58	00 04	02 08	32 30 18
April	70 68 69	79 73 79	02 01	06 06	09 05 10
May	20 09 56	51 49 78	11	02 05	34 35 22
June	61 84 90	82 80 30	05 06 02	04 03 01	21 14 11
July	92 62 49	11 80 74	02 13 02	01 06 07	19 18 25 20
Aug.	92 95 95	30 12 11	03 03 00	03 03 01	17 17 16
Sept.	56 54 46	29 76 71	02	02 01	18 21 25
Octob.	50 58 35	75 79 50	04 08	04 01	25 18 15
Nov.	10 34 09	09 25 25	25 25	01	01

TABLE III.

A Table shewing the Lowest Stations of the φ in the Year 1702. at *Townley* and *Upminster*, with the difference of the φ at both places.

Day of the Month	φ at Town	φ at Upmr.	Differ.
Feb.	29 15 28 50 27 50	29 50 16 20 43	35 60 93
4	39	05 05 62	66
Dec. 23	77 71 90	18 12 10	31 41 35

High Stations: f φ An. 1702.			
	Upmr.	Town	
Jun. 30	25 19	29 95 95 83	30 30 34
Mar. 12	33 35 32	30 02 05 07	31 30 25
Oct. 21	07 18 22	29 94 99 00	13 19 22

More settled Stat. An. 1702.			
	Town	Upmr.	
Apr. 27	30 04 00 02	30 13 15 16	09 15 14
28	03 01	16 16	13
29	29 99 98 93 86	15 15 13 06	16 17 20 20
May 13	78 74	29 89 87 87	11 15 13
June 10	30 40 44	68 71 70	38 31 26
11	50 51 59	70 72 70	20 21 11
Aug. 30	45 57 59	86 89 88	41 29 29
Sept. 27	73 72 73	91 91 91	18 19 18
28	74 78 73	91 93 93	17 17 20